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(54) Title: RINSE CONDITIONER COMPOSITION (57) Abstract A rinse conditioner composition, giving excellent deposition of a Colour Care Active onto fabric, so preventing the fading of coloured fabrics is provided, comprising a fabric softening compound, and 0.01 % to 10 % by weight of the total composition of a Colour Care Active, wherein the Colour Care Active is not stable to light and further wherein when the composition comprises up to 0.05 % of the Colour Care Active the cationic fabric softening compound comprises a quaternary ammonium compound having at least one ester linking group or nonionic softening compounds or mixtures thereof. Also provided is a process of treating laundry comprising placing the laundry in a domestic washing machine, or suitable washing vessel, for example a bucket; washing the laundry under normal domestic conditions; and adding the above composition at the rinse stage of the laundry cycle.		

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RINSE CONDITIONER COMPOSITION

Technical Field

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The present invention relates to rinse conditioner compositions. In particular the present invention relates to rinse conditioner compositions that give an additional benefit, other than merely softening or perfuming the fabric, particularly preventing colour fading of fabrics.

Background and Prior Art

Rinse conditioners are commonly used to deposit a softening compound and a perfume onto a fabric. Their use to deposit other fabric treatment aids has been commercially limited mainly due to difficulties in depositing the fabric treatment aid onto a fabric.

It is known in the textile industry (WPI ACC No 92 - 336162/41 and WPI 92-138679/17) to apply UV absorbers and antioxidants to synthetic fibres used in carpets and furnishing fabrics to minimise fading. However the textile compositions, UV absorbers used, and methods and levels of application are not suitable for domestic processes.

US 4 788 054 (Bernhardt) teaches the use of N-phenylphthalisomides as ultraviolet radiation absorbers for cotton, wool, polyester and rayon. The compositions require that an aqueous sulphuric acid vehicle is required for deposition.

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US 5474691 Severns teaches that photofading of fabrics can be prevented by treating the fabric using a tumble dryer article comprising a conditioning compound, a uv absorbers and/or an antioxidant. However this system of delivering the uv absorber/antioxidant to the laundry results in an uneven deposition of uv absorber/antioxidant. A further disadvantage with this system is that a high level of uv absorber/antioxidant has to be used.

- 10 WO 96/03486 (Procter & Gamble) discloses fabric care compositions to reduce the fading of fabrics from sunlight, comprising a light stable sunscreen compound.

The problems associated with the prior art of poor deposition and thus use of high levels of Colour Care Active are addressed by the present invention. The present invention also addresses the problems of incompatibility between the softening compound and a Colour Care Active and the problem of poor phase stability of the rinse conditioner.

Definition of the Invention

Thus according to one aspect of the invention there is provided a rinse conditioner comprising a cationic fabric softening compound and 0.01% to 10% by weight of the total composition of a Colour Care Active, wherein the Colour Care Active is not light stable and further wherein when the composition comprises 0.05 wt% or less of the Colour Care Active the cationic fabric softening compound comprises a quaternary ammonium compound having at least one ester linking group or nonionic fabric softening compounds, or mixtures thereof.

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The invention also provides a process for treating laundry, the process having the following steps:

- 5 i) placing the laundry in a domestic washing machine, or suitable washing vessel, for example a bucket;
- ii) washing the laundry under normal domestic conditions.
- 10 iii) adding the rinse conditioner composition of the invention at the rinse stage of the laundry cycle.

The invention further provides the use rinse conditioner composition according to the invention prevent the fading of
15 coloured fabrics.

Detailed Description of the Invention

The present invention has the advantage that it delivers a
20 Colour Care Active onto the fabric with very little Colour Care Active being wasted within the rinse liquor.

Compositions of the invention have the further advantage that the Fabric Treatment Aid is not incompatible with the
25 fabric softening phase of the formulation and thus there is little, or no, phase instability.

By the term not stable to light is meant the sunscreen agents of the present invention demonstrate light stability
30 in the compositions of the present invention. Light stable means that the sunscreen compounds in the compositions of the present invention do not decompose when exposed to either sunlight or simulated sunlight for

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approximately 2 to 60 hours at a temperature of from about 25°C to about 45°C.

The Colour Care Active

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The Colour Care Active used according to the invention is any compound, not stable to light, used to give an effect other than the commonplace effects of cleaning, softening or perfuming the fabrics.

10

Typical examples of Colour Care Actives include compounds used to prevent the fading of coloured fabrics. The invention also encompasses mixtures of these agents. This invention is particularly advantageous in delivering compounds used to prevent the fading of coloured fabrics, which may be mixtures of UV absorbers.

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The term Colour Care Active in the context of the present application specifically excludes perfumes, strongly ionising species such as cationic quaternary ammonium compounds, sulphonates, phosphates and polymeric compounds. The term includes fabric anti-fading agents (including UV absorbing compounds).

20

The Colour Care Active is preferably hydrophobic as these materials deposit well onto the fabric in the presence of the delivery system of the present invention.

25

In the context of the present invention the term not light stable refers to those agents which degrade with time when exposed to UV radiation, in particular to those showing average degradation values of approximately 25% or greater, over a period of 5 hours.

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- The Colour Care Active is present in the compositions at a level from 0.01 to 10 % by weight of the total composition. When the compositions of the invention comprise 0.05% or less by weight of the colour active then the cationic fabric softening composition comprises a quaternary ammonium compound having at least one ester linking group, or a nonionic fabric softening compound or mixtures thereof.
- 10 Preferably the compositions comprise from 0.025 to 9 % by weight of the Colour Care Active more preferably more than 0.5 to 8.5%, e.g. 0.55 to 7 %. Often amounts less than 5% may be used. The level of Colour Care Active to be used in a given composition is dependent on the Agent that is to be delivered.

The ratio of Colour Care Active to cationic softening compound is preferably from 4:1 to 1:500, more preferably from 1:180 to 1:7.

20

- The Colour Care agent is preferably non fabric staining. It may be a single UV absorbing compound or a mixture of compounds which absorb solar radiation in the wavelength range 280nm through to 400nm. More preferable are those UV absorber compounds which have high extinction coefficients across this part of the spectrum.

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- Examples of typical UV absorbers which may be used according to the invention include the following. This list is not meant to be exclusive:

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2- ethylhexyl-4-methoxy cinnamate,
2-ethoxyethyl-4-methoxy cinnamate,

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normal or iso propyl-4-methoxy cinnamate,
iso amyl-4-methoxy cinnamate,
cyclohexyl-4-methoxy cinnamate,
octyl cinnamate,

- 5 2 ethyl hexyl, 3,3,5 trimethyl, cyclohexyl, amyl, menthyl,
homomenthyl, phenyl, benzyl and decyl salicylate esters.

The following acrylates may also be used;

- 10 2-ethylhexyl-2cyano-3,3'-diphenylacrylate;
ethyl2-cyano-3,3'-diphenylacrylate;
3-imidazol-4yl acrylic acid and ethyl ester;
2-cyano-3-(4methoxyphenyl)acrylate and hexyl ester;

15

Especially preferred UV absorbers for use in the present
invention are:

- 2-ethylhexyl-4-methoxycinnamate also known as 2-ethylhexyl-
20 3-(4-methoxyphenyl) propenoate (PARSOL MCX ex Givaudan);
2-ethylhexyl-4-dimethylaminobenzoate; 4-aminobenzoic acid.

- The fabric care agent preferably has a c.logP. of value of
4.0 or more, preferably 5.0 or more, more preferably 5.2 or
25 more.

The Fabric Softening Compound

- In the first instance any suitable fabric softening compound
30 is suitable for use with the present invention, in
particular nonionic softening compounds and cationic
softening compounds.

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Where the compositions of the inventions comprise the Colour Care Active in an amount of up to 0.05% at most, then the cationic fabric softening compound in this case comprises a quaternary ammonium compound having at least one ester linking group or nonionic fabric softening compounds, or mixtures therefore. When the compositions comprise more than 0.5% by weight of the Colour Care Active then the fabric softening compound may comprise any fabric softening compound as referred to herein.

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However, it is preferred if the fabric softening compound is cationic in nature. Preferably the cationic fabric softening compound of the invention has two long chain alkyl or alkenyl chains with an average chain length greater than C_{14} , more preferably each chain has an average chain length greater than C_{16} , more preferably at least 50% of each long chain alkyl or alkenyl group has a chain length of C_{18} .

It is preferred if the long chain alkyl or alkenyl groups of the fabric softening compound are predominantly linear.

The cationic fabric softening compositions of the invention are compounds which provide excellent softening, characterised by chain melting $-L\beta$ to $L\alpha$ - transition temperature greater than 25°C , preferably greater than 35°C , most preferably greater than 45°C . This $L\beta$ to $L\alpha$ transition can be measured by DSC as defined in "Handbook of Lipid Bilayers, D Marsh, CRC Press, Boca Raton Florida, 1990 (Pages 137 and 337).

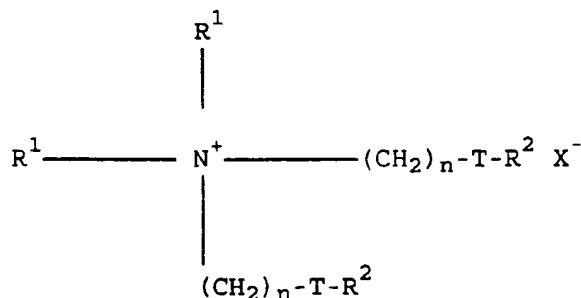
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It is preferred if the softening compound is substantially insoluble in water. Substantially insoluble fabric

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softening compounds in the context of this invention are defined as fabric softening compounds having a solubility less than 1×10^{-3} Wt% in demineralised water at 20°C, preferably the fabric softening compounds have a solubility less than 1×10^{-4} , most preferably the fabric softening compounds have a solubility at 20°C in demineralised water from 1×10^{-8} to 1×10^{-6} .

It is especially preferred if the fabric softening compound is quaternary ammonium compound, especially a water insoluble quaternary ammonium material which comprises a compound having two C_{12-18} alkyl or alkenyl groups connected to the molecule via at least one an ester link. This is an ester linking group as referred to above. It is more preferred if the quaternary ammonium material has two ester links present. The especially preferred ester-linked quaternary ammonium material for use in the invention can be represented by the formula:



wherein each R^1 group is independently selected from C_{1-4} alkyl, hydroxyalkyl or C_{2-4} alkenyl groups; and wherein each

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R² group is independently selected from C₈₋₂₈ alkyl or alkenyl groups;

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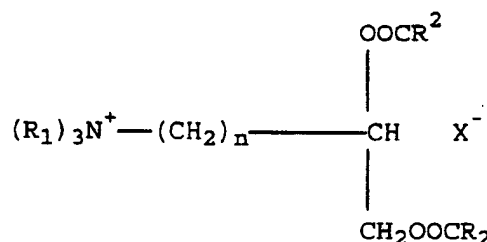


T is -O-C- or -C-O-; X⁻ is any suitable anion and

10 n is an integer from 0-5.

A second preferred type of quaternary ammonium material can be represented by the formula:

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25 wherein R₁, X⁻, n and R₂ are as defined above.

It is advantageous for environmental reasons if the quaternary ammonium material is biologically degradable.

Preferred materials of this class such as 1,2 bis[hardened
30 tallowyloxy]-3-trimethylammonium propane chloride and their
method of preparation are, for example, described in US 4
137 180 (Lever Brothers). Preferably these materials
comprise small amounts of the corresponding monoester as
described in US 4 137 180 for example di-hardened
35 tallowyloxy -2-hydroxy trimethylammonium propane chloride.

- 10 -

The fabric softening agent may also be polyol ester quats (PEQs) as described in EP 0638 639 (Akzo).

5 Suitable nonionic softening agents include pentaerythritol esters, sorbitan esters, mono, di and triglycerides.

The compositions typically comprise 0.1-50% by weight of the fabric softening agent, preferably 1-45%. If the compositions are concentrated compositions they preferably
10 comprise 8%-50% by weight fabric softener, e.g. 8%-35%. If the compositions are dilute compositions they typically comprise 0.5-8% by weight fabric softener, e.g. 1-6%. Preferably the compositions are free of sulphuric acid.

15 Composition pH

The compositions of the invention preferably have a pH of at least 1.5, preferably 1.5 to 5.

20 Other Ingredients

The composition can also contain fatty acids, for example C₈-C₂₄ alkyl or alkenyl monocarboxylic acids, or polymeric carboxylic acids. Preferably saturated fatty acids are
25 used, in particular, hardened tallow C₁₆-C₁₈ fatty acids.

The level of fatty acid material is preferably more than 0.1% by weight, more preferably more than 0.2% by weight. Especially preferred are concentrates comprising from 0.5 to
30 20% by weight of fatty acid, more preferably 1% to 10% by weight. The weight ratio of fabric softening compound to fatty acid material is preferably from 10:1 to 1:10.

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The composition can also contain one or more optional ingredients, selected from non-aqueous solvents, pH buffering agents, perfumes, perfume carriers, colourants, hydrotropes, antifoaming agents, polymeric or other thickening agents, opacifiers, antioxidants and anti-corrosion agents.

The compositions of the invention may be in any product form such as solid (e.g. powder or granules) or a paste; however it is preferred if they are liquid. The principal medium for the composition will often be water, although compositions may comprise up to 10 wt% of a water-miscible solvent.

It is preferred if the compositions of the invention do not contain alkoxylated β -sitosterol compounds.

A process for treating laundry using the above compositions typically comprises the steps as below:

- i) placing the laundry in a domestic washing machine, or suitable washing vessel, for example a bucket. Any suitable vessel may be used.
- ii) washing the laundry under normal domestic conditions;
- iii) adding the above composition at the rinse stage of the laundry cycle.

The invention will now be illustrated by reference to the following non-limiting Examples. Further examples within

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the scope of the present invention will be apparent to the person skilled in the art.

All percentages are percentages by weight.

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EXAMPLES

The following rinse conditioner products were prepared using a Silverson high shear mixer. Sunscreen was incorporated
10 into hot water, without pre-heating, after addition of the molten active.

Examples 1 to 3

Example	% by weight		
	1	2	3
Fabric Softener ³	-	24.2	24.2
Fabric Softener ²	4.8	-	-
Parsol mcx ¹	0.4	4.0	2.0
Minors	up to 1.0%	up to 1.5	up to 1.5
Water	to 100%	to 100	to 100

15

¹ 2-ethylhexyl 3-(4-methoxyphenyl) propenoate available from Givaudan. It is unstable to light and has a clogP value of 5.2.

² Di[hardened tallowoxyloxy ethyl] dimethyl ammonium chloride
20 (ex. Clariant)

³ A mixture of Dihardened tallow dimethyl ammonium chloride (available as Anquad 2HT ex. Akzo) and methyl

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bis(partially hardened tallow amido ethyl)-2hydroxyethyl ammonium methyl sulphate (ex. Accosoft 460).

Example 1 is a dilute rinse conditioner whilst examples 2
5 and 3 are concentrated rinse conditioners.

The examples were tested to show the benefit in colour fading over an example that did not contain any of the Parsol MCX. The control for the example 1 contained 4.8 wt%
10 of fabric softener² and the same amount of minors, with water to make the composition to 100 wt%. The control for examples 2 and 3 contained 24.2 wt% fabric softener³ and the same amount of minors, with water to make the composition to 100%.

15 The examples were tested for anti-colour fading effect using a single colour dyed cotton fabric with 0.1% (on weight of the fabric) Levafix Turquoise EG.

20 Machine Details

Example 1 and its control were tested in a Miele front loading washing machine (10 litre fill) @ 40°C, 12° FH water. There were 4 cold rinse, 12° FH, (23 litre fill).

25 Examples 2 and 3 and their control were tested in a Whirlpool top loading washing machine (75 litre fill) @ 35°C, 6° FH water. There was 1 cold rinse, 6° FH water (75 l).

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Washing Powder

Example 1 and its control were washed in Persil Automatic colour variant purchased in UK, 75 g/wash.

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Examples 2 and 3 and their controls were washed in Tide Ultra 2 powder purchased in the USA, 65 g/wash.

Dosage of the Rinse Conditioner Example

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Example 1; 125 g in the final rinse.

Examples 2 and 3; 30 ml in the final rinse.

Ballast for the washes

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Example 1 - 24 approx, 1 m² pieces of de-sized 65:35 polyester: cotton sheeting fabric made into 6 overlapped multilayer sandwiches 4 cloths thick, plus

20 - 2 pieces of dyed cloth as used for monitors, 85 x 85 cm plus approx two times 1 m² desized cotton sheeting total load = 2.5 kg overall polyester: cotton ratio 50:50.

Examples 2 and 3 - 30 approx 1 m² pieces as above but where
25 the sandwich has 5 layers thick.

- 2 pieces of dyed cloth as above but the total load weight = 3 kg.

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Monitors

Example 1; 4 pieces of cotton sheeting 50 x 50 cm each with
10 x 10 cm test pieces attached as; 4 pieces dyed fabric in
5 corners, 2 pieces of white fabric in centre.

Examples 2 and 3; 4 pieces of white cotton sheeting 50 x 50
cm attached as; 4 pieces 10 x 10 cm dyed fabric in corners,
2 pieces of white fabric in centre.

10

Test Method

The following test method was adopted for the examples and
their controls.

15

1. The reflectance of each test monitor was taken using an
ICS spectroflash 500 reflectometer. Each cloth is
measured in 2 positions on the side that bears the
label and which has been irradiated. The reflectometer
20 software is used to calculate Delta E values according
to the CIELAB 1964 supplement for D65 illuminant and 10°
observer.

2. The cloths were attached to ballast pieces. The test
25 cloths for example 1 were added, evenly distributed to
the drum and the washing powder and rinse conditioner
added to the dispensing draw.

The test cloths for example 2 and 3 were added to the
30 machine which was approx ¾ full of water and to which
the washing powder had been added and had dispersed.
The cloths were added as the water fill completed.

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3. The washing cycles were completed with the compositions of examples 2 and 3 being added during the rinse fill and being dispersed in the water and not added directly onto the cloths.
- 5 4. The washing cycles were completed and the test cloths tumble dried.
- 10 5. The reflectance of 2 dyed pieces from each set of 4 plus the two white cloths was taken as above 4 thicknesses of cloths at a time.
- 15 6. The cloths from 5 were exposed to UV radiation in an Atlas Weatherometer model Ci65 (ex Atlas Electric Devices of Chicago) that mimics Florida sunshine for 5 hours.
- 20 7. The reflectance of the cloths was re-measured after irradiation.
8. The washing machine and ballast was cleared by running through a washing cycle but omitting rinse conditioner.
- 25 9. Where the cloths were subjected to multi-cycle treatments steps 2-8 were repeated for the appropriate number of times.

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The anti-fading fabric benefit, expressed as $\Delta\Delta E$ over control for each sample is given below;

	1 5 cycle multiwash	2 single cycle wash	3 5 cycle multiwash
Benefit over control as $\Delta\Delta E$	0.374	0.24125	0.25625

- 5 $\Delta\Delta E$ is the colour difference between the average values of control and sample.

Example 4 2-ethylhexyl 3-(4-methoxyphenyl)-2- propenoate degradation

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The degradation of 2-ethylhexyl 3-(4-methoxyphenyl)-2-propenoate when padded from heptane onto white cotton sheeting @ 0.608% on weight of fabric. The sheeting is air dried and the K/S is measured on a Perkin Elmer Lambda 14 Spectrophotometer as a base reading. K/S is calculated as

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$$K/S = \frac{(1 - R/100)^2}{2R/100} \quad \text{where } R = \text{Reflectance (At } \lambda \text{ 320 nm Parsol MCx)}$$

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The measured cloths were exposed in an Atlas Weatherometer Weatherometer model Ci65 ex Atlas Electric Devices of Chicago that mimics Florida sunshine to 1 hour of simulated Florida midday sunlight. The cloths were measured again and then exposed again and re-measured until the cloths had been irradiated for 5 hours and the cloths measured five times.

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The degradation was then calculated over the no. of hours the sample had been irradiated in terms of % Parsol MCX remaining on the cotton sheeting. The results are given below;

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Time (hours) or irradiation	% of 2-ethylhexyl 3-(4-methoxyphenyl)-2-propenoate remaining on the fabric
0	100
1	87.78
2	80.66
3	57.88
4	50.34
5	46.31

The degradation can be calculated by 100- the % remaining on the fabric.

CLAIMS

- 1) A rinse conditioner composition comprising a fabric softening compound, and 0.01% to 10% by weight of the total composition of a Colour Care Active wherein the Colour Care Active is not stable to light, and further wherein when the composition comprises 0.05 wt% or less of the Colour Care Active the cationic fabric softening compound comprises a quaternary ammonium compound having at least one ester linking group or nonionic softening compounds, or mixtures thereof.
- 2) A composition according to claim 1 in which the Colour Care Active has a c.logP value of 4.0 or greater.
- 3) A composition according to either claim 1 or 2 which is in liquid form.
- 4) A composition according to any one of the preceding claims in which the level of Colour Care Active is from 0.025 to 9% by weight, preferably 0.55% to 7%.
- 5) A composition according to any one of the preceding claims in which the weight ratio of Colour Care Active to fabric softening compound is from 4:1 to 1:500.
- 6) A composition according to any one of the preceding claims wherein the fabric softening compound is a quaternary ammonium compound.

- 20 -

7) A process for treating laundry, comprising the steps:

i) placing the laundry in a domestic washing machine,
or suitable washing vessel, for example a bucket;

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ii) washing the laundry under normal domestic
conditions;

iii) adding the above composition at the rinse stage of
the laundry cycle.

10

8) Use of a rinse conditioner composition as defined in
any one of claims 1 to 6 to prevent the fading of
coloured fabrics.